Boston University

Graduate School

Thesis

THE PERFORMANCE OF MALE OVER FEMALE STATURENS

by

Madeline Catherine Rainey

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I. Introduction

Modern psychology emphasizes the importance of adapting the schools to meet the needs of individual pupils so that each child may have the incentive and the opportunity to realize his best possibilities. As a result of this expansion of the educational system the problem of speech disorders among school children has been receiving more general recognition and attention. According to statistics,[1] over 1,000,000 of the population of the United States are stutterers. Of this number, 250,000 are children in school. These defects may act as a very serious handicap and are a source of mortification in school and later life.

Terminology

In an attempt to simplify, the present tendency is to use the terms stammering and stuttering interchangeably. This defect is more serious than any of the others because of its many acute phases. It is a spasmodic action of the muscles involved in speech production. According to Fletcher[2] it is "a temporarily appearing inability to begin the pronun-

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[1]Travis, Lee Edward - Speech Pathology, p. 101.

[2]Fletcher, John M. - An Experimental Study of Stuttering, American Journal of Psychology (1914), p. 201 - 255.

ciation of a word or syllable - a spastic coordination neurosis." Scripture[1] calls it a disease "marked by the following cardinal symptoms: 1, psychic hypertonicity and spasms of the muscles of speech; 2, anxiety (embarrassment or fear); 3, fixation of these conditions by habit; and 4, the existence of these symptoms only in the presence of other persons." Kenyon[2] believes that "stammering is an extraordinarily abnormal manner of reaction .... affecting the psychomuscular act of speech production of an individual who is emotionally disturbed by social relations." Glassburg[3] concludes that stuttering is a "spastic coordination neurosis based on a mental conflict." Browning[4] defines it as a phase of hyperthymism closely allied to or part of that known as lymphatism. "There is regularly some block in the thymic area, usually attributed to thymic enlargement or persistence. The morbid influence," he continues, "thus exerted and constituting the immediate cause of the stammering may provisionally be classed as an inhibitory reflex."

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[1]Scripture, E. W. - Stuttering and Lisping, p. 38.

[2]Kenyon, Elmer L. - Conscious Detailed Psycho-muscular Control of Speech Production, Mimeo. 1931

[3]Glassburg, John A. - Stuttering - The Cause and Cure, Archives Otolaryngology, 5:122 (February), 1927

[4]Browning, William - Neurographs, Vol. I #4, p. 334.

The Etiology of Stammering

Many opinions have been offered concerning the etiology of stammering. The most widely accepted of these may be stated briefly. During the eighteenth century the medical men traced stammering to malformations in the speech organs. It was thought to be due to derangements of vocalization, articulation, and incorrect respiration. For a time, heredity was considered to be an important factor, but today it is an accepted fact that stuttering cannot be inherited. Several cases of stuttering, it is true, are often found in one family but the defect is acquired by imitation and association rather than heredity. Another very common cause of stammering is fear arising from a nervous shock. A forced recovery after a severe illness, a fall, a terrifying experience, or a great physical strain are often the sources of this speech disorder. Brown[1] offers another view that was suggested by psychiatrists connected with the Child Guidance Clinics - that stuttering is due to a personality or behavior disorder, emotional in origin and nature. The theory of cerebral dominance as the cause of stammering is based upon the work of Orton and more especially that of Travis. Such men as Brill, Borden, Busse, and Coriat believe that stammering is caused by repressed desires and that

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[1]Brown, Frederick - The Problem of Stuttering, Mimeo. 1931

the morbid anxiety which arises is the result of the patient's fear of himself and of those perverse desires which he has attempted to submerge. Bluemel[1] who formerly considered auditory amnesia as the primary cause of stuttering, now holds a somewhat different view - that stuttering is a thought disturbance rather than a speech disorder.

The Problem

On one point all authorities are in agreement, that is, that the overwhelming majority of stammerers are males. The estimates of these differences in sex range from 2:1 to 10:1. This preponderance seems to indicate that sex is an important factor in the causation of this affliction. Various theories in explanation of this disparity in numbers have been advanced but it remains a moot problem. In this study an attempt has been made to gather together as many of these theories as possible through a careful search of educational, psychological, and medical writings dealing with this and allied problems.

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[1]Bluemel, C. S. - Mental Aspects of Stammering, p. 3.

II. Preliminary Information.

Statistics of Various Investigators

Conradi[1] made an extensive study of 87,440 children in the following cities of the United States:

Milwaukee	31,810
Cleveland	19,678
Louisville	14,865
Albany	11,369
Springfield	5,902
Kansas City	3,816

There were 44,754 boys and 42,685 girls. He found that 1.25% of all the boys stuttered, while only .47% of all the girls stuttered, the ratio being 3:1. He then compared his results with those of other investigators in this field. Their results are given below:

Denhardt, Ssikorski, and Hartwell	- ratio 3:1
Lindberg (in cities in Denmark)	- ratio 3:1
Westergaard (in Denmark)	- ratio 2.5:1.9
Von Sarbo (in villages of Hungary)	- ratio 3:1
_____, (in towns and cities)	ratio 2:1
Baginsky	- ratio 2:1
Chervin ratio was much greater	- ratio 10:1

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[1]Conradi, Edward - The Psychology and Pathology of Speech Development, Pedagogical Seminary, (1904), p. 327 - 80. (Vol. XI)

Gutzmann - found that the ratio changed with the age, the adult males greatly outnumbering the adult female stutterers, ratio being about 9:1 while among children it was only 2:1.

Tompkins, Fletcher, Scripture, and West agree with the finlings of Gutzmann that the male preponderance increases from childhood to adulthood. Tompkins[1] observes that among adults the ratio is probably 9:1, and among school children, about 3:1. He believes that there is a marked decrease as we go back toward infancy. Although he has no statistics to prove it, he is convinced that baby girls stammer as frequently as baby boys. "Therefore," he infers, "8/9 of the girls must recover from the defect." Fletcher[2] notes that the ratio in adult stammerers is probably as high as 10:1, and in children, about 2:1. Furthermore, he states that "males are more likely to acquire the defect and are much more likely to continue it once it has been acquired." Scripture[3] finds that the relative frequency among males and females ranges from 2:1 to 9:1. West[4] reports that while the boys always outnumber the girls, the ratio changes from grade to grade through school as is shown by the following table.

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[1]Tompkins, E. - Stammering Discussions, Journal of Abnormal Psychology, 1917-18 p. 260. (Vol. 12)

[2]Fletcher, John M. - The Problem of Stuttering, p. 56.

[3]Scripture, E. W. - Op. cit.

[4]West, Robert - The Phenomenology of Stuttering, Mimeo. 1931

Table 1

Grade 1	3.1 to 1
Grade 2	3.4 to 1
Grade 3	3.6 to 1
Grade 4	4.2 to 1
Grade 5	4.2 to 1
Grade 6	4.0 to 1
Grade 7	4.8 to 1
Grade 8	3.7 to 1
Grades 9 & 10	3.7 to 1
Grades 11 & 12	5.5 to 1

He points out that at puberty the ratio drops to 3.7 to 1, then "immediately rises to the highest point in the series." The tabulation of the White House Conference report on speech disorders among school children is quoted in Table 2.

Table 2

The Distribution of Stuttering by Grade and Sex

Grade	Boys	Girls	Total
1	629	203	832
2	840	244	1084
3	966	267	1233
4	1052	252	1304
5	1141	269	1410
6	1091	271	1362
7	853	179	1032
8	660	180	840
9 & 10	611	166	777
11 & 12	333	61	394
Totals	8176	2092	10268

As West points out "the increase in the total number of stuttering cases, boys and girls, is due to the increase in

the number of boys with very little increase in the number of girls." He estimates that the average increase over the next lower grade is 128 for the boys.

In 1916, Wallin[1] published the results of his investigation of 89,057 children in the St. Louis Public Schools. There were 44,124 boys and 44,933 girls between the ages of 5 and 21. His findings showed that 1.1 per cent of all the boys stuttered, while .4 per cent of all the girls stuttered, giving a ratio of more than 2:1. Of these 31.3 per cent of the boys were severe cases as compared with 22.5 per cent of the girls who were severe cases.

Among others who have studied the distribution of stuttering in boys and girls are some of the best known specialists in speech correction work. Their ratios vary slightly. Brill[2] reports that the ratio is usually about 3:1. J. Greene[3] reports that there are 5 or 6 stuttering boys to 1 stuttering girl. Blanton[4] notes that the distribution ranges

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[1]Wallin, J. E. W. - A Census of Speech Defectives in the St. Louis Public Schools, School and Society, (1916), p. 215.

[2]Brill, A. A. - Speech Defects and Mental Diseases, Quar. Jour. of Speech Education (1923), p. 129.

[3]Greene, J. & E. Wells - The Cause and Cure of Speech Disorders, p. 76.

[4]Blanton, S. & M. Gray - Child Guidance, p. 108.

from 4:1 to 6:1. Martin's[1] statistics show that about 84 per cent of all speech defectives are males. D. Greene[2] in his study of 256 adult stammerers found that 89.46 per cent were males, whereas 10.54 per cent were females.

Anderson[3] made a study of the stutterers in the Minneapolis Public Schools by giving a series of tests in grades 6 - 8, to determine sex differences. He arranged the groups so that there were always twice as many boys as girls.

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[1] Martin, Frederick & Louise - Manual of Speech Training, p.15.

[2] Greene, David - The Preponderance of Male Stammerers over Females, N.Y. Med. Jour., LXXIII, (1901), p. 635

[3] Anderson, L. O. - Stuttering and Allied Disorders, Comp. Psy. Monographs (1922-25), p. 61.

Table 3 - Sex Differences
(Quoted from Anderson[1])

Test	Boys Cases	Boys Scores	Boys P.E.	Girls Cases	Girls Scores	Girls P.E.	D+ P. E_D
1. Hand Coordination Test							
No. right with metronome	41	0.6		21	0.7		
No. right without metronome	41	0.7		21	0.6		
Errors per person with "	41	3.51	0.66	21	3.67	0.43	3.4
Errors per person without "	41	6.02		21	5.76		
2. Block Test							
Speed	41	13.99		21	12.90		
Number right	48	31.23	0.76	24	28.46	0.74	2.5
Time shortest	43	14.56		20	14.50		
Time median	43	18.72		20	18.43		
Time longest	43	31.63		20	30.35		
A.D. of trials from median	43	3.31		20	3.01		
3. Association Test							
Time 10 percentile	36	7.51	0.27	18	6.66	0.23	2.3
Median	36	11.32		18	10.22		
4. Questionnaire Test							
Time (min.)	34	2.02		17	2.32		
No. words	34	13.50	1.04	17	17.20	2.19	
5. Inhibition Test							
Forbidden responses	32	5.69		16	6.31		
Partly inhib. forb. res.	32	4.66	0.37	16	6.00	0.50	2.2
All partly inhib. res.	32	8.28		16	11.87		
Late responses	32	18.78		16	22.56		

[1]Anderson, L.O. - Op. cit., p.61

It will be seen from the above table that a sufficient reliable difference was found in only one test, "Number of errors" in the Hand Coordination Test. Since there appear to be no sex differences in the "Number right", it would seem to indicate that boys are more apt than girls to get flustered or to make many errors in those trials in which they made a slip, or else girls are more apt to recover or collect themselves after making a slip. Here and in some of the other tests there appear slight sex differences corresponding to a difference found between defectives and normals, but in each case the P.E. is too large and in one case the difference does not correspond in direction. From these results there is a slight indication that stuttering is partly dependent upon factors which are peculiar to the male sex.

Distribution in the Providence Public Schools

Speech correction classes have been carried on in the Providence Public Schools for a period of six years. During this time the work has been gradually expanded as is shown in Chart I. The consistent preponderance of the boys is apparent from even a cursory inspection. The ratio, about 3 to 1, seems to be rather constant from year to year.

Chart I

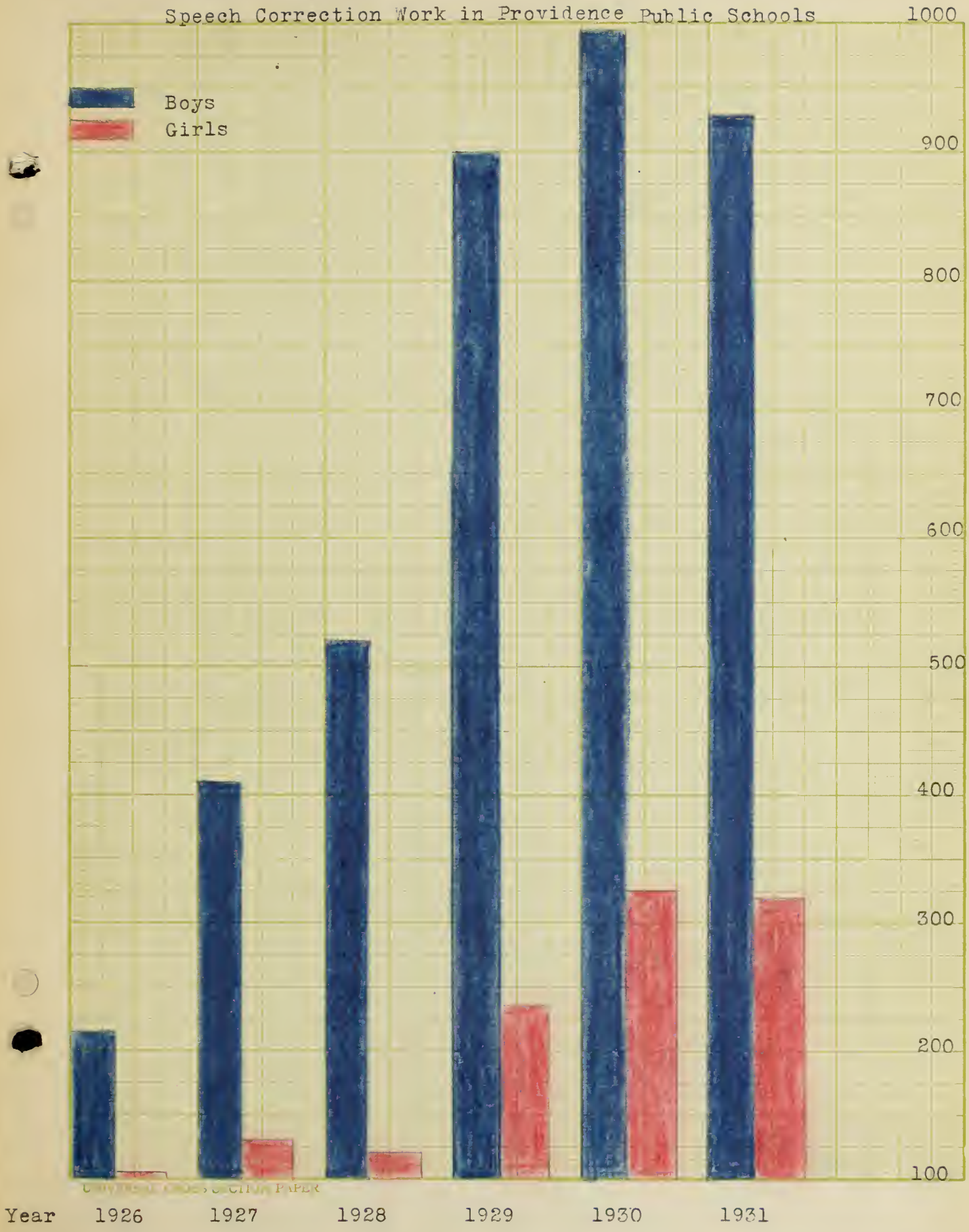
Speech Correction Work in Providence Public Schools
Boys
Girls
1000
900
800
700
600
500
400
300
200
100
Year
1926
1927
1928
1929
1930
1931

Table 4

Distribution of Stammering
by
Grade and Sex in Providence Public Schools
1930 - 1931

Grades	Boys	Girls	Total
I	6	3	9
II	22	10	32
III	52	21	73
IV	72	18	90
V	80	26	106
VI	96	18	114
VII	88	13	101
VIII	80	11	91
IX	30	9	39
X	23	6	29
XI	5	3	8
XII	2	1	3
Totals	556	139	695

The distribution of stammering in these classes by grades and sex is shown in more detail in Table 4.

Considering the number of boys and girls from grade to grade who stammer, we find that the increase among boys continues steadily with an average increment of 18 over the preceding grade. The peak is reached in the sixth grade. With the entrance into the junior high schools comes a decrease which continues on through the senior high schools. This is readily seen in Chart II. This decrease is due partly to the fact that some pupils have recovered from stammering after having received treatment, and partly to the fact than in the junior and senior high schools it is sometimes difficult to arrange their programs so that they may attend speech correction classes with-

out conflicting with other subjects. If we now consider the girls who stammer we shall note that the curve in Chart II is very irregular. It rises in the first three grades, drops in the fourth only to rise to its peak in the fifth grade. This decrease is noted through the eighth, but rises in the ninth and tenth grades slightly, then drops in the last two grades. These findings seem to agree with those of West that the "increase in the number of male stutterers is the cause of increase of stuttering in the lower grades."

Chart II

Stammering in Grades I - XII

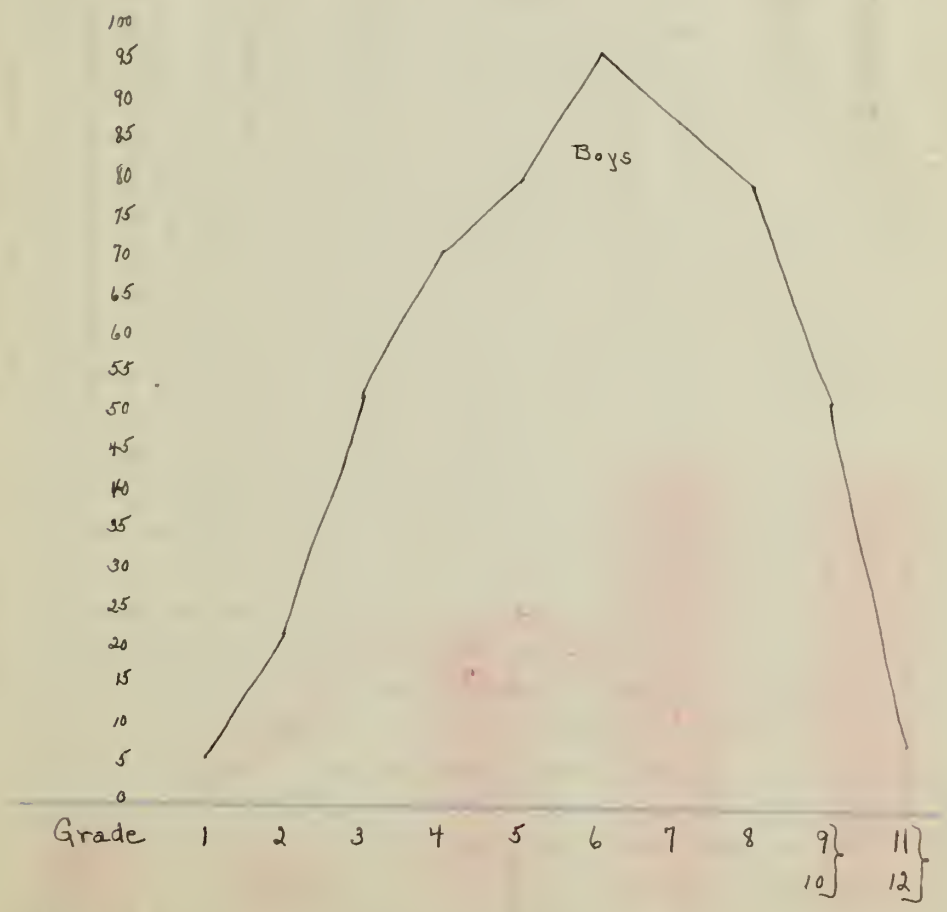

Table 5 indicates the consistent increase of the boys only, through the sixth grade noting the increase over the preceding grade. The average increase is 18.

Table 5

Increase of Boy **Stammerers**
by Grades

Grade	Boys	Increase over lower grade
I	6	-
II	22	16
III	52	30
IV	72	20
V	80	8
VI	96	16
Average increase		18

The ratio from grade to grade in the Providence schools is very changeable. There seems to be a steady increase from grade one to four, with a slight drop in grade five, which we have previously pointed out as a peak for the girl stammerers. Then it rises again until in the eighth grade we find 7.3 boys to every girl. It is interesting to observe that though the ratio changes in every grade the boys always surpass the girls in number. This ratio by grades is given below.

Table 6

Ratio from Grade to Grade

Grade I	2.0 to 1
" II	2.2 to 1
" III	2.5 to 1
" IV	4.0 to 1
" V	3.1 to 1
" VI	5.3 to 1
" VII	6.6 to 1
" VIII	7.3 to 1
" IX	3.3 to 1
" X	3.8 to 1
" XI	1.6 to 1
" XII	2.0 to 1

A study of the enrolment data by sexes and grades in the Providence Schools was made in order to determine the frequency at all levels in terms of per cent. The results are shown in Table 7 for the boys and in Table 8 for the girls. In all grades the boys' per cent is higher than the girls'. It will be noted that in the primary, intermediate, and junior high schools the frequency of stammering for girls was .01 per cent, but among the boys, the per cent increased, .02 in the primary; .05 in the intermediate; and .08 in the junior high.

Table 7

Frequency of Stammering Among Boys

Grades	Primary	Intermediate	Junior High	Senior High
Boys	80	248	198	30
Per cent	.02	.05	.08	.009

Schools	No. enrolled	No. of cases	Per cent
Senior High	3209	30	.009
Junior High	2634	198	.08
Intermediate	5408	248	.05
Primary	3424	80	.02

Table 8

Frequency of Stammering Among Girls

Grades	Primary	Intermediate	Junior High	Senior High
Girls	34	64	33	10
Per cent	.01	.01	.01	.003

Schools	No. enrolled	No. of cases	Per cent
Senior High	3317	10	.003
Junior High	2676	33	.01
Intermediate	4886	64	.01
Primary	2911	34	.01

Special difficulties arose in the study of the data in the above tables because of the limitations of the speech corrective work in Providence. Since there are but three trained teachers giving instruction to these speech defectives, the work has had to be somewhat concentrated. Classes are held once a week for one period only. Of course, in the senior high schools, it is impossible to include all those who need this instruction in this one period since it is bound to conflict with some other major subject in their programs, which differ so greatly from one another. Every effort is made, however, to reach as many as possible. In the junior high schools the classes are also held once a week, but following the regular "rotation plan" of these schools the work is spread over three different periods. In this way many more pupils can be cared for readily. Practically every intermediate school receives speech instruction

weekly. The larger schools in this group also contain primary grades, and pupils in these buildings attend the speech classes without any program difficulty. Furthermore, these schools are often used as centers to which some children from the nearby primary schools are sent for instruction. There are, nevertheless, many small primary schools that are not receiving any attention at the present time because of the lack of teachers with the necessary theoretical and clinical experience. Therefore the per cents quoted in tables 8 and 9 are based upon the population of those particular schools from which the stammerers were taken. A study of the scholarships of a group of 123 stammerers consisting of 25 girls and 98 boys in grades III - IX showed that the majority of them are doing average or better work.

Table 9

Scholarship of Providence, R. I.

Group	Grade	Girls Cases	Girls Per cent	Boys Cases	Boys Per cent
1	A or B	10	40	26	27
2	C or average	9	36	42	43
3	Below C	6	24	30	30
Total		25	100	98	100

From the above table it is noted that 76 per cent of the girls and 70 per cent of the boys are receiving passing marks in school. Twenty-four per cent of the girls and 30 per cent of the boys are failing, but a number of these failures are due

to their speech handicap. A more detailed study of the school achievement of stammerers in the Providence Public Schools has been made by Ballard.[1]

Summary

The results of the studies reviewed in this chapter seem to indicate that: -

1. The outstanding majority of stammerers are males.

2. The ratios of sex differences range from 2:1 to 10:1.

3. Among children the average ratio is about 4:1.

4. The ratio is not a constant thing but increases from childhood to adulthood.

5. The ratio among adults is about 9:1. In other words, among 1000 adults it is reasonable to believe that there will be 10 stutterers. Of these, 9 will be males and 1 female.

6. The increase of stuttering in the lower grades is due to the increase in the number of male stutterers rather than that of females.

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[1] Ballard, Elizabeth I. - The Influence of Stammering Upon the Achievement of School Children, Un-Published Thesis, Boston University, 1931.

III. Theories of Causes for Male Preponderance.

For many years there has been a constant interest in the question of sex differences among stammerers. Studies have been contributed by the scientific workers of many nations, for this interest has been international in its scope. These investigators have been advancing many theories to explain why there should be so many more male stutterers than female stutterers, but to date it is still an open question. Broadly these theories have fallen into three groups based upon physiological, psychological, and sociological differences between the two sexes.

Physiological Causes

Since stammering is characterized by certain physical symptoms or spasmodic movements it seems reasonable to look towards physiology for an explanation of the sex differences. One of the physiological causes which has frequently been suggested as being responsible for the male preponderance is the disturbance of respiration. In 1901, David Greene[1] published the results of his study in this field. He examined a group of adult stammerers classifying them according to their methods of breathing. The results are given in Table 10.

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[1]Greene, David - Op. Cit.

Table 10

Breathing of Adult Stammerers

	Males	Females
Number of cases of stammering caused by faulty inspiration	139	3
By faulty expiration:		
a) Mismanagement of voice	25	20
b) Defective articulation	8	-
c) Both a and b	57	4
Total	229	27

He discovered that during actual stammering, the costal and abdominal muscles seem to be temporarily "out of gear." The diaphragm contracts spasmodically while the ribs scarcely move. He noted that "this misdirected effort in the diaphragm is the most prolific source of stammering among men, but is rarely found among women." The reason for this, he believes, is because women generally use the costal type of breathing. This means that the lungs always contain sufficient air for speaking purposes. Among men, on the other hand, cases of defective inspiration are very common. As a rule, they use the diaphragm for breathing. In speaking, however, "a considerable emptying of the quantity of air in the lungs must take place and this can only be effected through the combined processes of diaphragmatic and costal breathing." A conflict ensues which results in stammering. He is convinced that this fact is the real cause of the preponderance.

The results of another experiment on the respiratory force of the sexes which he and others carried on, are given in Table 11.

Table 11

Respiration Tests

I. Forced Respiration

	Inspiration	Expiration
Men	100	120
Women	60	80

II. Ordinary Quiet Respiration

	Inspiration	Expiration
Men	60	80
Women	40	50

Having tested many thousands by means of the pneumatometer, they discovered that the respiratory force of women is considerably lower than that of men. This accounts for the fact that the majority of females who stammered did so because of mismanagement of the voice (as is shown in Table 10), while among the males most of the stammering was caused by faulty inspiration. Terman[1] arguing from data collected from authorities on speech defects, seems to agree with Greene that the costal type of breathing is more prevalent among girls than boys. He believes that this is one of the principal reasons why fewer girls stammer. Gutzmann,[2] Fogerty,[3] and

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[1]Terman, Lewis M. - The Hygiene of the School Child, p. 335.

[2]Gutzmann - In the "Psychology and Pathology of Speech Development," by Edward Conradi ... Ped. Sem. (1904), p. 327.

[3]Fogerty, Elsie - Stammering, p. 30.

Fletcher[1] also appear to support this theory since they consider breathing difficulties as such an outstanding factor in stuttering. Browning[2] also believes that the thoracic type of breathing which is used by girls more than boys prevents "thymic block" and consequently stammering occurs less frequently. His theory is explained in detail at the end of this chapter.

Many other investigators have pointed out that handedness is often the cause of stuttering and show how it may account for the sex difference among stammerers. In his comprehensive study, "Sinistrality and Speech," Ballard[3] found that twice as many boys as girls are lefthanded. This means that a great many more lefthanded boys than girls are required to change over to the right hand for writing. This change in handedness is thought to cause stammering. These findings are substantiated by the work of Wooley[4]. She discovered that "lefthandedness is more frequent in boys than in girls whether the indication of it is sought in strength, steadiness, or rapidity." Another experiment along this line was conducted by Ssikorski[5]. In examining papers of about 2492 boys and 5640 girls he reports that atactic hand-

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[1]Fletcher, John M. - Op. cit.

[2]Browning, Wm. - Op. cit.

[3]Ballard, P.B. - Quoted by Terman, L.M., Op. cit., p. 335

[4]Wooley, Helen T. - An Experimental Study of Children, p. 512

[5]Ssikorski, - Quoted by Conradi, Edward, Op. cit., p. 327-30.

writing was 7 or 8 times as frequent with boys as with girls. The percentage of lefthandedness was twice as great among boys. He concludes that this shows " a better hereditarily developed motor center in the left hemisphere, since the oral speech center and motor center for right handed persons are located near together in this hemisphere." He also believes that this is the reason why girls of the pre-school age are less subject to stuttering. Travis[1], in the Speech Clinic at the University of Iowa, has worked out what is known as the cerebral dominance technique. He points out that "since the central nervous system functions as an integrated whole there is imperative need for a single functionally dominant center for such a complicated activity as speech." The vast amount of clinical material on hand strongly indicates that the left cerebral hemisphere of right handed individuals and the right cerebral hemisphere of left handed individuals contains the lead gradient." His theory is that stuttering is due to "the lack of an inherent bias for the development of a sufficiently dominant gradient of excitation in the central nervous system to integrate the movements of the organism in the production of normal speech." He has discovered that 43% of the hundreds of right handed stutterers who have been examined at the Clinic were originally left handed, and that left handed boys greatly outnumber left handed girls. However, he neglects to offer an explanation for this male preponderance.

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[1]Travis, Lee Edward - Op. Cit., p.140.

Terman[1] believes that the inrate superiority of girls in physical movements in general could be seen in the superiority over boys in writing. Lincoln's[2] findings affirm this idea. He reports an experiment which was carried on by Gesell in 1906, the results of which are quoted in Table 12.

Table 12

Handwriting Test in Worcester, Massachusetts

	Boys		Girls	
	Number	Per cent	Number	Per cent
Best Writers	122	38.8	193	61.2
Poorest Writers	238	75.5	77	24.5

He collected specimens from 4361 pupils in grades I - IX, and selected 3 of the best writers and 3 of the poorest ones in each grade. Then he separated the papers according to sex. He found that 61.2% of the best specimens were written by girls while 75.5% of the worst papers were written by boys. In grades III and IV, 64.4% of the best papers were written by girls and 94.0% of the worst ones from the same grades were submitted by boys. Even in high school the superiority of girls was noted, showing 76.6% of the best specimens were provided by girls and 80% of the worst by boys. Another experiment in Bloomington, Illinois, was a handwriting test that

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[1]Terman, Lewis M. - Op. cit.

[2]Lincoln, E. A. - Sex Differences in School Children, Chap. IV

was given from grades 2B through 8A. These results are set forth in Table 13.

Table 13

Handwriting Test in Bloomington, Illinois

Grade	Average number letters per minute		Average quality on Ayers'	
	Boys	Girls	Boys	Girls
2B	9.3	11.8	37.4	46.8
2A	15.1	16.3	41.3	44.5
3B	17.7	18.9	36.7	41.2
3A	26.6	29.3	36.7	42.3
4B	32.1	34.5	35.2	42.1
4A	37.1	37.7	37.3	45.8
5B	47.0	48.3	33.3	38.6
5A	43.3	45.1	35.0	44.7
6B	44.7	54.6	29.5	39.5
6A	52.8	60.4	34.4	38.4
7B	52.0	53.0	40.3	49.2
7A	58.0	67.0	34.4	47.3
8B	59.7	59.3	41.2	64.4
8A	58.6	52.1	46.5	58.9

In speed, the girls show a constant superiority although in some grades the difference is probably too small to be significant. In quality, however, their superiority is marked, sometimes with as much difference as a full step on the Ayres' Scale. These results seem to indicate that Terman's statement is correct for the girls do exceed the boys in handwriting no matter whether comparisons are made on the basis of grade or age. There are not sufficient data, however, to permit any definite conclusion upon this point. A more comprehensive study of the relation of handedness to speech is being made at the present time by McKenna[1].

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[1] McKenna, Mary E. - The Relation of Handedness to Speech. Unpublished A.M. Thesis, Boston University, (in preparation).

Liebmann[1] believed that the difference in musculature of men and women might account for speech difficulties. Man's muscles are stronger without a doubt, but woman's are more flexible and graceful. Therefore her speech is more fluent. It may be noted in passing that Rousseau, Kussmaul, and Chervin substantiate this theory[2] believing that the better developed nervous systems of females make them naturally more graceful in their movements and able to converse in a more fluent manner. Waldeyer[3] pointed out that "though the entire musculature of woman is inferior to that of man, the tongue alone is an exception." The importance of a flexible tongue in the formation of speech can not be questioned. The linguistic superiority of girls has been reported by practically all investigators in this field. This superiority is first manifested in a greater precocity of beginning speech development. Through school, whenever the sexes have been compared as to scores on subjects of a linguistic nature the girls seem to exceed the boys consistently. A contribution made by Stevens[4] indicated that the speech mechanism of a normal girl is remarkably strong which accounts for the fact that little girls not only begin to talk at an earlier

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[1]Liebmann - Quoted by Conradi, Edward - Op. cit.

[2]Quoted by Conradi, Edward - Op. cit.

[3]Waldeyer,- Quoted by Conradi, Ibid.

[4]Stevens, Mabel - Class Work in Treatment of Stuttering, Ped. Sem. (1917) # 24, p. 49

age than little boys, but also speak more fluently. This, she believes, is the reason why girls are more apt to become hysteria subjects rather than stutterers. Furthermore, she questioned whether stuttering may not be considered the equivalent among males for hysteria among females.

Still another theory is offered by Brill[1] and Martin[2] who believe that the male excess is due to the greater variability of that sex. Yet the results of the study of sex differences in variability published by Lincoln[3] indicate that neither sex can be called more variable than the other on the basis of the data now available. He discovered that the strongest foundation of this theory is found in the characteristics of the reproductive cells. The female cells are large and inert as compared with the small, active, and energetic male cells. For this reason, he concludes, "man is more active, energetic, eager, passionate, and variable; woman, more passive, conservative, sluggish, and stable." West[4] speculates as to a possible endocrine cause of stuttering. As he points out "it would be surprising to discover a marked sex difference that did not have some ramification into the endocrine system" since the endocrine basis of sex and its effect upon structure and function in general has been definitely established. Dr. Browning[5], agreeing somewhat with the above believes that the sex proportion among

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[1]Brill, A. A. - Op. cit.

[2]Martin, Frederick and Louise Op. cit.

[3]Lincoln, Edward - Op. cit.

[4]West, Robert - Op cit.

[5]Browning, William - Op. cit.

stutterers has nothing to do directly with sexual functions, but "as a matter of thymism it becomes readily explicable." He claims that all stutterers show large thymus, for he collected data of cases of lymphatism found in more than one hundred reports published both in this country and Europe. All of these cases were verified by either operation or autopsy. There were 60 males to 41 females between the ages of one and sixteen. The figures happened to have been gathered in two groups, each of which showed a ratio of about 50 per cent more males than females. He explains that his statistics are strengthened by the allied observations of Paltauf and Perrin. The former published a table of 143 male to 82 female infants who died suddenly from asphyxia attributable to large thymus. The latter's study of a family of eleven children showed that the 9 boys all died in the same manner. The 2 surviving members were girls. He feels that these facts seem to demonstrate that lymphatism is considerably more frequent in boys than in girls. "With respect to sex ratio," he continues, "stammering not only agrees with that in thymic enlargement but differs radically from that of the adjacent thyroid." Statistics show that 58 per cent more females than males are victims of goiter. In reference to respiration he points out that the thoracic type of breathing utilized by females naturally favors the "lifting and freeing of the upper outlet of the chest and thus does away with thymic block and its consequences." This would account for the low ratio of female stutterers.

Summary

In general, these various writers assumed that:

1. The disturbance in respiration seems to account for the male preponderance in stammering.

2. Faulty inspiration causes most of the stammering among males.

3. Since lefthandedness is far more frequent in boys than in girls, more boys would be required to change their natural handedness. This might account for the male preponderance in stammering.

4. Girls show a marked superiority over boys in handwriting, indicating an innate superiority of girls in physical movements in general.

5. Woman's muscles, including those of speech, are more flexible and graceful; therefore her speech is more fluent.

6. Females, having a better developed nervous system, are able to converse in a more fluent manner than males.

7. Woman's tongue is more flexible than man's, thus accounting for her marked linguistic superiority.

8. The speech mechanism of a girl is remarkably strong, which accounts for the fact that girls begin to talk at an earlier age than boys, and speak more fluently.

9. The male sex is more variable - the strongest foundation being found in the characteristics of the reproductive cells.

10. A marked sex difference may be due to an endocrine cause of stuttering.

11. Enlargement of the thyroid is more common in girls while that of thymus is more common in boys.

12. The relative immunity of females is due to: a) the lesser frequency of thymo-lymphatism in girls; and b) the costal type of respiration in females.

Psychological Causes

The psychic causes of stammering are those that arise from an interruption of the normal function of the mental processes concerned in the production of speech. It has long been established that emotional conflicts in early childhood may remain as subconscious memories, disturbing the speech function. Among stammerers fear is the outstanding disturbing element. This fear like all emotions must be checked lest it become an obsession which will affect the whole psychological development of a person. Since any interference with the outflow of nerve energy from the brain is a neurosis, all stammerers have an anxiety neurosis, that is, a worry either consciously or subconsciously over the inability to speak. This is often referred to as the compulsive idea, "I cannot speak like other people" which lies in the subconscious mind. Many psycho-analysts accept the Freudian idea of stammering that the child loses control of the speech organs because the control is blocked by certain repressed emotional complexes. They believe that boys have more repressions than girls, therefore they stammer more than girls. Coriat[1], for example, claims that boys stammer because they constantly fear that one of their tabu terms may slip out at the wrong time. He believes that stammering is a result of these emotional reactions. Girls, having no such vocabulary, are not bothered with this fear. This possibility was also noted by Dunlap[2] who reported that boys have

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[1]Coriat, Isadore - Stammering as a Psychoneurosis, Journal of Abn. Psy., IX (1914-15) p. 417.

[2]Dunlap, Knight - The Stuttering Boy, Journal of Abn. Psy. (1917-18), p.44.

especial difficulty "with words beginning with sounds with which certain obscene words much favored by small boys also begin." In other words boys are afraid that a slip of the tongue might reveal a forbidden vocabulary. He believes that while a boy with a rugged constitution "may keep his two linguistic personalities distinct," one with a weak constitution is very apt to become a stammerer. Most girls on the other hand do not have this fear and consequently do not stutter as much as boys. Borden[1] states that boys stammer because of a fear that they may inadvertantly reveal the presence of certain hidden desires, and speech, a normally automatic function, is upset by this fear.

According to Fletcher[2], years ago Stekel referring to sex differences classified stammering as " a form of hysteria with an anxiety mechanism originating in sexual traumata." Yet all neurologists agree that many more females are subject to hysteria than males. Brill[3] reports that while psychoneuroses in general are far more common among females, stammering is more common among males. He claims that these psychoneurotic symptoms of man, however, are merely exaggerations of a normal activity, for in men, speech is a reaction to a deeper mental process than in women. This dates back to primitive times when men were forced to scheme,

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[1]Borden, R. and A. Busse - Speech Correction, p. 280

[2]Fletcher, John M. - Op. cit.

[3]Brill, A. A. - Op. cit.

concentrate, and remain silent while warring and hunting for food. Greene[1], believing that a stutterer's condition is functional, depending upon his nervous constitution, his nervous emotional life, notes that while woman is more nervous than man, she is better capable of maintaining her coordination under emotional stress. "For that reason, it requires an exceptionally severe shock to cause her to lose her balance, hesitate, and stutter." Swift[2] reports that psycho-analysis reveals stuttering as some vague trouble in the personality. He finds that this trouble is an absent or weak visualization at the time of speech. Basing the explanation of the male and female ratio on this theory, he claims that women visualize better than men and use visualization more. A study, published by Lyers[3] also shows that females are markedly superior to the males for average number of words remembered and that they have a high central tendency. This idea is supported by Bluemel[4] who bases his statement on Galton's statistical inquiries. He found that visual imagery is stronger in women than in men, so he believes that the auditory imagery is probably more intense. If this be true, then a minor functional derangement would be less likely to obliterate or obscure it, and hence "would be less likely to induce stammering." Further-

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[1]Greene, J. and L. Wells - Op. cit.

[2]Swift, Walter - A Psychological Analysis of Stuttering, Jour. Abn. Psy. X, (1915-16), p. 255

[3]Lyers, Garry C. - Incidental Memory for Words, Archives of Psy., (1913-15), p. 69

[4]Bluemel, C.S. - Stammering and Cognate Defects, Vol. I, p. 210

more, he states that this fact alone would be sufficient to account for the male preponderance. Again, he points out that aphasia is also more common among males, quoting Dr. Gyllie, "Aphasia is much more common in the male than in the female sex." This is probably because "the underlying pathological conditions, namely the various forms of cerebral softenings, are much more common in males than in females."

From a study of about five thousand children with behavior difficulties reported by Dr. Schroeder[1] of the Illinois Institute for Juvenile Research, the incidence of stammering was found in about two per cent of the girls and in about four per cent of the boys. Because selective factors may have entered into the composition of this group, no definite interpretations were attempted. It was interesting to note, however, that stammering appeared to be characteristic of the shy, sensitive, inadequate, and neurotic sort of child rather than of the child with aggressive conduct traits.

Other researches[1] have shown also that stammering occurs in individuals with a neurotic family history. Since it is largely through speech that man expresses his emotions it is natural that emotional conflicts should be manifested in speech. It is known

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[1] Schroeder, Paul - Relationship of Personality and Behavior Difficulties to Disorders of Speech, Mimeo. 1931

[2] Stivers, Charles G. - Oral Stammering ... Mimeo. 1931

that neurotics react violently to sense perception and resent the intrusion of another authority. Resentment at this intrusion coupled with an emotional conflict often results in stammering. It is natural for a boy, especially an adolescent, to resent this intrusion more than a girl, for this is the time when his psychic independence becomes established. If his parents' over-anxiety handicaps his freedom of thought and performance he often takes drastic measures to emancipate himself, "since the adolescent feels that he and his group understand more fully and know better all that is essential to life and conduct than older people. The tendency for a time is to be fundamentally impervious to adult influences, since adults seem to him to have lost step with the times."[1]

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[1]O'Shea, M.V. - The Child: His Nature and His Needs, p.110

Summary

In summary, the following explanations have been suggested:

1. Boys have more repressed emotional complexes than girls, therefore they stammer more than girls.

2. Boys stammer because they fear that one of the tabu terms may slip out at the wrong time.

3. Psychoneuroses are more common among females, and stammering is more common among males.

4. Woman is better capable of maintaining her coordination under emotional stress, thus it requires a very severe shock to cause her to lose her balance and stutter.

5. Since women visualize better that men and use visualization more, stammering, caused by an absent or weak visualization at the time of speech, would be less frequent.

6. Females are markedly superior to the males for average number of words remembered.

7. Auditory imagery is probably more intense in women than in men, so a minor functional derangement would be less likely to obscure it or to induce stammering.

8. Aphasia is more common in the male than in the female sex.

9. Among children with behavior difficulties, stammering is found in about 4 per cent of the boys and in about 2 per cent of the girls.

10. Boys resent the intrusion of authority more than girls, and the emotional conflict often results in stuttering.

Sociological Causes

Speech is a means of communication, the chief way in which an individual attempts to adjust himself to the social group. Stammering shows a maladjustment to this social situation. According to Brown[1] "the basis of the neuro-muscular incoordinations and of many of the physical and emotional manifestations which accompany them is to be found in the stutterer's lack of adjustment to certain social situations." It is an accepted fact that some persons stammer only when at home; some only when called upon to recite in school; some only when trying to converse with friends; and some only when speaking before strangers. Therefore, attempts have been made to explain the sex ratio among stammerers on a sociological basis. In doing so, however, the statement made by Allen[2] that the social training of the two sexes is, and always has been different, producing differential selective factors, interests, and standards, must always be kept in mind.

Many writers have shown that parental discipline, either too harsh or too tender, rivalry and jealousy of siblings are conditions that are likely to predispose a child to stammer. Fogerty[3] believes that this type of surrounding coupled with attempts to justify the constant boastings of a vain and over-ambiticus mother accounts for the fact that so large a proportion of stammerers are

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[1]Brown, Frederick - Op. cit.

[2]Allen, C.R. - Studies in Sex Differences, Psy. Bul. 24, (1927), p. 301

[3]Fogerty, Elsie - Op. cit.

boys. She feels that many times the stammer is used as a defense mechanism especially where the above factors are represented in the opposing personalities of father and mother. The difference in treatment of boys in the home has also been suggested by Terman[1] and Conradi[2]. They both believe that the more intimate relationship between girls and their mothers during childhood accounts for the superiority of girls. They lead much more sheltered and circumscribed lives than boys, spend much more time in the home, and therefore have their errors in speech corrected early. Furthermore, girls being more imitative than boys, pick up the words they hear more correctly as a rule than boys, according to Stern[3]. The boys, on the other hand, make much wider contacts outside the home since they spend much of their time on the streets where they acquire knowledge and a vocabulary far different from that of their homes. These writers also agree that the relatively quiet and unexciting mode of life to which girls are accustomed, tends to prevent accidents or shocks which may lead to stuttering. Conradi quotes Kussmaul's suggestion that girls are called upon to move in society earlier than boys and thus acquire more poise in conversation. Some writers intimate that stuttering is less endurable socially to a girl than to a boy.

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[1]Terman, Lewis - Op. cit.

[2]Conradi, Edward - Op. cit.

[3]Stern, William - Psychology of Early Childhood, p. 156

Fletcher[1] thinks that for this reason severe cases among girls would tend to leave school, thus accounting somewhat for the male excess.

Another cause given by Terman[2], Greene[3], and Brill[4] was that girls are more voluble than boys thereby gaining more practice in speech production, but none of these writers have offered any explanation as proof of this statement. Brill further claims that women express themselves through speech quicker than men because they never encounter as much criticism as men. Jastrow's[5] idea is that more men are subject to stammering than women, not because they are more timid, but because it is a more serious fault for a man to lack courage. In that sense, a man is more afraid of being afraid. So long as concessions in timidity are allowed in women, there is less resistance to the expression of fear. Goodenough[6] suggests that the linguistic superiority of girls (noted as an infantile developmental trait) has probably been strengthened by certain social factors influencing

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[1]Fletcher, John M. - Op. cit., p.56

[2]Terman, Lewis - Op. cit.

[3]Greene, J. and E. Wells - Op. cit., p. 76

[4]Brill, A. A. - Op. cit.

[5]Jastrow, Joseph -"Keeping Mentally Fit," chapter in "The Healthy Mind," edited by Henry Elkins, p.252-253

[6]Goodenough, Florence - Consistency of Sex Differences in Mental Traits at Various Ages, Psy. Rev., Vol. 34 (1927), p. 440

development in later years.

Under more favorable environmental conditions the superiority of girls in school achievement, especially in the linguistic subjects, is marked. Bernard[1] arguing from data showing differences in efficiency between the sexes in school, notes that the variation is generally attributed to differences in physiological maturity. He believes, however, that the differences in interests sanctioned by the community and by tradition for the two sexes may have had much influence on the results. He agrees that girls show most improvement in the years before puberty and that the boys forge ahead after that period. He points out that there is an important environmental fact in this connection for according to custom and economic circumstances "the intellectually competitive career of most girls ends at puberty while that of boys begins." He also shows that many investigations have proved that men are more interested in things and events, preferring business or professional contacts. Women, on the other hand, are more interested in emotions and persons. Thus he claims that tradition and custom tend to determine sex differences in the acquisition of interests and skills. Therefore they will account somewhat for differences in speech.

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[1]Bernard, L.L. - An Introduction of Social Psychology, p.259

Summary

To sum up, the following suggestions have been offered:

1. Boys rebel more often against attempting to justify the boastings of a vain and over-ambitious mother, using stammering as a defense mechanism.

2. The difference in treatment of boys in the home often causes them to be emotionally maladjusted to the parents' points of view, with stammering as a result.

3. Girls, being more imitative, pick up words they hear more correctly than boys.

4. Boys make wider contacts outside the home, acquiring knowledge that is likely to exaggerate inhibitions and induce stammering.

5. Girls lead much more sheltered lives and have their speech errors corrected in their early years.

6. Girls are called upon to move in society earlier than boys, thus acquiring more poise in conversation.

7. Girls are more voluble than boys, and gain more practice in speech production.

8. Women never encounter as much criticism in speech as men, so they express themselves through speech quicker than men.

9. It is a more serious fault for men to show timidity or fear than for women; therefore more men are subject to stammering than women.

10. The linguistic superiority of girls is probably strengthened by certain social factors.

11. Differences in achievement by girls and boys are influenced by differences in interests sanctioned by the community and by tradition.

12. Men are more interested in events and things: women, in emotions and persons.

IV. Summary and Conclusions.

In this study of the male preponderance in stammering, an attempt has been made to include as much information as possible concerning the various theories of sex differences that have been offered in the publications of the past thirty years. Although for practical purposes these theories have been divided into the physiological, psychological, and sociological aspects, we must realize that there is necessarily much overlapping of the three and such a distinction is at best an artificial one.

The problem of stammering itself is peculiarly complex since[1] "stammering, being psychogenetic and psychophysical in its reflexes, works in a vicious cycle of symptoms.. under certain conditions of social irritability." No definite conclusions have ever been reached concerning the cause of this disorder. Until this has been decided, we shall have to be satisfied with mere speculations as to the causes of the sex differences among stammerers. However, the majority of the studies which have been made, including that of the present writer, seem to agree that:

1. The outstanding majority of stammerers are males. The ratio ranges from 2:1 to 10:1, increasing as we go from childhood to adulthood.

2. Among children, the average ratio is about 4:1; but among adults it seems to be about 9:1.

3. Through school, the increase of stuttering in the lower

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[1]Martin, Frederick and Louise - Op. cit., p. 12

grades shows a large increase in the number of male cases with very little change in the number of female cases.

Summary

The theories regarding the causes back of these findings are too numerous and too complex to enable us to draw hasty conclusions as to their significance. In resume, however, the following suggestions seem reasonable enough to assume:

1. The differences in the physical process of breathing may play a part in determining the speech difficulties of the two sexes. All investigators seem to agree that the costal type of breathing is more prevalent among females. Cases of defective inspiration are very common among males.

2. Since the sex differences in lefthandedness correspond in direction with those in stuttering, it is not without warrant to assume that they may have a possible connection. Although the theory of cerebral dominance has not yet been satisfactorily proven, most workers in the field of speech correction insist that no interference with handedness should be allowed. It has been noted that cases, predisposed to stuttering, are likely to be exaggerated if a change in handedness is attempted.

3. The anatomical and physical differences in the sexes may account for speech differences.

4. The lesser frequency of thymo-lymphatism in girls

may be the cause of their relative immunity to stuttering. Enlargement of the thyroid is more common in girls, while that of thymus is more common in boys. Therefore sex differences in stuttering may have an endocrine basis.

5. Boys may have more repressed emotional complexes than girls. They are taught that they must always be courageous and never show any fear. On the other hand, concessions in timidity are permitted to girls, who thus offer less resistance to the expression of fear. It is a known fact that among stammerers fear is an outstanding disturbing element.

6. Boys make wider contacts outside the home, acquiring knowledge especially that of socially forbidden matters such as sex, obscene language, etc. which is likely to exaggerate inhibitions. The fear that one of the tabu terms may slip out inadvertantly may upset his speech control. Girls lead much more sheltered lives, being more constantly in contact with the mother's influence. Therefore their speech is more carefully guarded and errors are corrected during their early years.

7. The difference in treatment of boys in the domestic environment may produce effects upon personality. As a rule, girls are likely to be better adjusted emotionally to parents' points of view than are boys. The latter are more apt to resent the intrusion of authority, causing an emotional conflict with stuttering as a result.

8. Psychological analyses have shown that stuttering is an absent or weak visualization at the time of speech. Since women

visualize better than men and use visualization more, they are less likely to stutter. Again, since visual imagery is stronger in women, it is possible that auditory imagery is more intense. This would indicate that a minor functional derangement would be less likely to obscure it, and stammering would be less frequent among females.

9. Aphasia is much more common in the male sex, probably because the many forms of cerebral softenings are more common in man than in woman.

10. The superiority of girls is noted in language activities and memory. Boys, on the other hand, surpass girls in information subjects and in most motor and manipulation tests, with the exception of handwriting. Probably these differences in achievement are due, not to a native sex difference, but to the influence of differences in interests sanctioned by the community and by tradition.

11. It seems probable to the present writer that girls make better emotional adjustments in school: 1) because of their superior achievement, and 2) because their behavior conforms more closely than boys' to that type of conduct which women teachers consider the acceptable standard.[1] This would seem to indicate that girls experience fewer emotional conflicts in school. Hence stammering, which is largely emotional in origin, would be less frequent among them.

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[1]Wickman, E.K. - Children's Behavior and Teachers' Attitudes, p. 44

In conclusion, this brief study of sex differences among stammerers has presented some theories which were derived from worthwhile experiments. It also offered theories, the fallacies and absurdities of which were too apparent to be considered seriously. Having little foundation in fact, these theories were entirely unproven and purely speculative. The scarcity of statistics was appalling, many writers having nothing to offer in proof of the conclusions which they had drawn. However, among the factors worthy of further investigation and study are: further research into the causes of stammering; examinations and medical study of stammerers concerning thymic enlargement; continued work by Travis, Bryngelson, and others regarding the theory of cerebral dominance; and many more psychological and psychiatric studies to determine the confusions and emotional conditions associated with stammering, with comparative studies of the two sexes from the results obtained.

V. Bibliography

Bibliography

1. Allen, C. A.

"Studies in Sex Differences." Psychological Bulletin 24 (1927), p. 294.

2. Anderson, L. O.

"Stuttering and Allied Disorders." Comparative Psychological Monographs, Vol. 1, (1922-25), p. 78.

3. Bernard, L. L.

"An Introduction to Social Psychology." New York: Henry Holt and Co., 1926.

4. Blanton, Smiley and Margaret Gray

"Child Guidance." New York: Century, 1927.

5. Bluemel, C. S.

"Mental Aspects of Stammering." Baltimore: Williams & Wilkins Co., 1930.

6. Bluemel, C. S.

"Stammering and Cognate Defects." New York and London: G. E. Stechert & Co., 1913, Vol. 1 and II.

7. Borden, Richard and Busse, Alvin

"Speech Correction." New York: F. S. Crofts & Co., 1925.

8. Brill, A. A.

"Speech Defects and Mental Diseases." Quarterly Journal of Speech Education, LX (1923) p. 129.

9. Brown, Frederick

"The Problem of Stuttering." Mimeograph, 1931.

Bibliography (continued)

10. Browning, William

Neurographs, Vol. I, #4, Albert T. Huntington, and Germany: Th. Stauffer, Universitat-Strasse, 26, Leipsic, 1915.

11. Conradi, Edward

"The Psychology and Pathology of Speech Development." Pedagogical Seminary, 1904, pp. 327-80. Vol. XI

12. Coriat, Isadore

"Stammering as a Psychoneurosis." Journal of Abnormal Psychology IX, 1914-15, p. 417.

13. Dunlap, Knight

"The Stuttering Boy." Journal of Abnormal Psychology, Vol. 12, 1917-18, p. 44.

14. Elkind, Henry (editor)

"The Healthy Mind." Chapter by Joseph Jastrow, "Keeping Mentally Fit." New York: Greenburg, 1929.

15. Fletcher, John M.

"An Experimental Study of Stuttering." American Journal of Psychology, Vol. 25, 1914, p. 201.

16. Fletcher, John M.

"The Problem of Stuttering." New York: Longmans Green & Co., 1928.

17. Fogerty, Elsie

"Stammering." New York and London: E. P. Dutton, Inc., 1930.

18. Glassburg, John A.

"Stuttering--The Cause and Cure." Archives Otolaryngology 5:122, February 1927.

19. Goodenough, Florence

"The Consistency of Sex Difference in Mental Traits at Various Ages." Psychological Review, Vol. 34, 1927, p. 440.

20. Greene, David

"The Preponderance of Male Stammerers Over Females." New York Medical Journal, LXXIII, 1901, p. 635.

21. Greene, James and Wells, Emile

"The Cause and Cure of Speech Disorders." New York: Macmillan, 1927.

22. Kenyon, Elmer L.

"Conscious Detailed Psycho-muscular Control of Speech Production." Mimeograph 1931.

23. Lincoln, Edward A.

"Sex Differences in School Children." Baltimore: Warwick and York, 1927.

24. Martin, Frederick and Louise

"Manual of Speech Training." Ithaca, N. Y.: by the authors, 1926.

25. Myers, Garry C.

"Incidental Memory for Words." Archives Psychology 4, 1913-15.

26. O'Shea, M. V. (editor)

"The Child: His Nature and His Needs." Valparaiso, Ind.: The Children's Foundation, 1924.

Bibliography (continued)

27. Schroeder, Paul

"Relationship of Personality and Behavior Difficulties to Disorders of Speech." Mimeograph 1931.

28. Scripture, Edward Wheeler

"Stuttering and Lisping." New York: Macmillan, 1912.

29. Stern, William

"Psychology of Early Childhood." Translated from third edition by Anna Berwell. New York: Henry Holt & Co., 1924.

30. Stevens, Mabel

"Class Work in Treatment of Stuttering." Pedagogical Seminary #24, 1917, p. 49.

31. Stivers, Charles G.

"Oral Stammering." Mimeograph 1931.

32. Swift, Walter

"A Psychological Analysis of Stuttering." Journal of Abnormal Psychology X, 1915-16.

33. Terman, Lewis M.

"The Hygiene of the School Child." Boston: Houghton Mifflin, 1914.

34. Tompkins, Ernest

"Stammering Discussions." Journal Abnormal Psychology, Vol. 12, 1918-18, p. 260.

35. Travis, Lee Edward

"Speech Pathology." New York: D. Appleton, 1931.

Bibliography (continued)

36. Wallin, J. E. Wallace

"A Census of Speech Defectives in St. Louis Public Schools." School and Society, 1916, Vol. 3 p. 215.

37. West, Robert

"The Phenomonolgy of Stuttering." Mimeograph 1931.

38. Wooley, Helen T.

"An Experimental Study of Children." New York: Macmillan, 1926.

Supplementary Bibliography
(Suggested references for further study)

39. Appelt, Alfred

"Stammering and Its Permanent Cure." 3rd edition. London: Dutton and Co., Ltd., 1911.

40. Ballard, Elizabeth I.

"The Influence of Stammering Upon the Achievement of School Children." Unpublished A. M. Thesis, Boston University, 1931.

41. Barnard, Raymond

"Studies of Speech Defectives." Elementary School Journal, Vol. 30, p. 604.

42. Blanton, Margaret G. and Smiley

"Speech Training for Children." New York: Century, 1919.

43. Boome, E. J. and Richardson, M. A.

"The Nature and Treatment of Stammering." New York: E. P. Dutton & Co., Inc., 1932.

Bibliography (continued)

44. Brill, A. A.

"Psychopathology of Everyday Life." Journal of Speech Education, 1914, pp. 80-113.

45. Fletcher, John M.

"The Etiology of Stuttering." Journal of American Medical Association, Vol. 66 (1916), p. 1079.

46. Head, Henry

"Aphasia and Kindred Disorders of Speech." New York: Macmillan, 1926, Vol. I and II.

47. Hollingworth, Leta

"Sex Differences in Achievement." American Journal of Sociology, 1914.

48. Lima, M.

"Speech Defects in Children." Mental Hygiene, 1927, #11, p. 795.

49. Makuen, Hudson

"The Treatment of Stammering." Journal of American Medical Association, (Sept. 1910)

50. McDowell, Elizabeth D.

"Educational and Emotional Adjustments of Stuttering Children." Teachers College, 1928.

51. McKenna, Mary E.

"The Relation of Handedness to Speech." Unpublished A. M. Thesis, Boston University. (In preparation)

52. Orton, Samuel T.

"Studies in Stuttering." Archives of Neurology and Psychiatry, Vol. 18, Nov. 1927.

Bibliography (continued)

53. Plant, J. S.

"Sexual Adjustments of Children." Journal American Medical Association, #93, (1929), p. 1939.

54. Starr, H. E.

"The H ion Concentration Applied to a Study of Metabolic Etiology of Stammering." American Journal of Psychology, 33:415-18, 1922.

55. Travis, Lee Edward

"Studies in Stuttering." Archives of Neurology and Psychiatry, Vol. 18, Nov. 1927.

56. Wallin, J. E. Wallace

"Theories of Stuttering." Journal of Applied Psychology, (1917), p. 349-67.

57. Wickman, E. K.

"Children's Behavior and Teachers' Attitudes." New York: Commonwealth Fund Publications, 1928.